

A Pocket Crystal Set

A Novel "Self-contained" Simple Receiver.

By "EXPERIMENTALIST"

BY way of a change, here is something for a young beginner to make, or to build for the pleasure of a youngster about 11 to 12 years old.

The set is a self-contained affair, being fitted with a single 'phone unit which can be pressed to the ear for listening; like all crystal sets, the miniature model requires to be connected to a good earth and a 50ft. outdoor aerial for best results.

The Tuning Coil

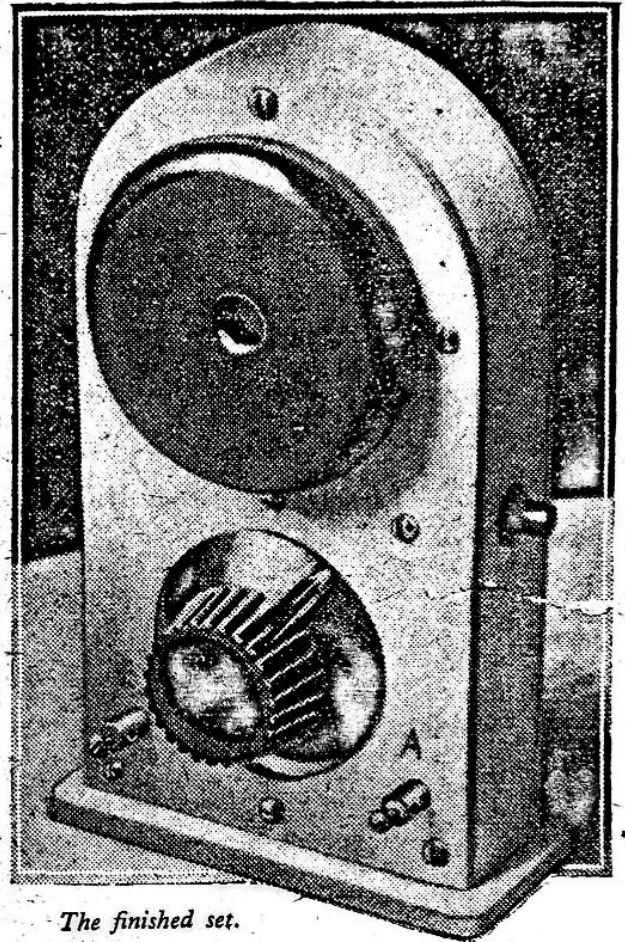
An unusual feature about the set is its tuning coil. This is merely a "ring" made from 28 s.w.g. enamelled wire (the gauge is not critical), it having a diameter of 1 1/4 in. and consisting of 36 turns bunched together with thread or 1/4 in. wide strips of gummed paper tape or insulation tape (see Fig. 2).

The coil, despite its size and construction, serves to tune the medium-wave band. The writer, on his experimental model, managed to tune in two frequencies, one of which was rather "drowned" by signals from a powerful local station. When the latter was tuned in properly reception was sufficiently strong to be heard a short distance away from the tiny receiver as it stood on a table. As children's hearing is infinitely keener than the hearing of grown-ups, this miniature "loud-speaker" reception will afford much pleasure, but naturally absolute quietness is essential.

The Front Panel

The front panel (A) shown at Fig. 1 is cut from 1/4 in. thick plywood or fretwood. Before cutting the aperture into which the ear-phone piece fits, the casing of the phone unit should be measured to find its exact diameter. Therefore, try and pick up an odd, second-hand 'phone unit, particularly a unit having lead terminals on its back. If an all-bakelite unit is used, it will be necessary to cut a small notch in the edge of the aperture to allow for the leads protruding from one side of the casing.

The casing must be a tight, force fit in its aperture, so it is better to cut the hole slightly smaller and file it



The finished set.

(with a half-round file) to suit the diameter of the casing neatly. Having done that, the various other holes shown can be drilled.

The Other Components

The coil, when made, is attached to the aerial and

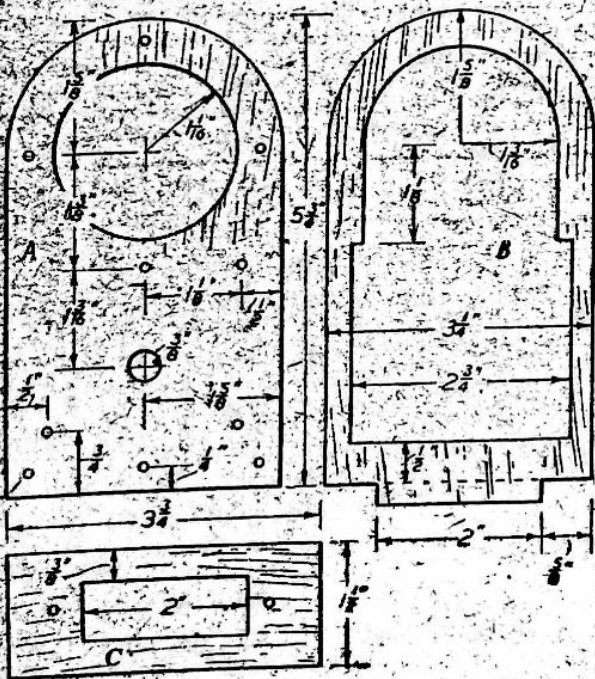


Fig. 1.—Size and shape of front panel, body and base.

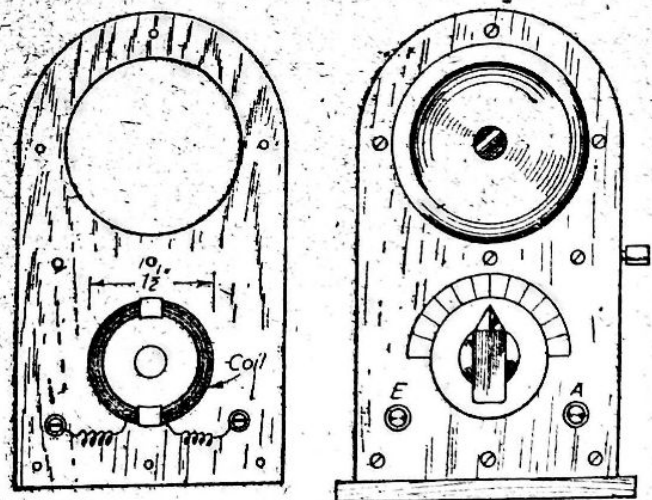


Fig. 2.—How the coil is connected, with front view of the set, showing smaller pointer knob and cardboard dial.

earth terminal screws, as shown at Fig. 2, on the reverse side of the front panel. A .0005 mfd. mica-spaced variable condenser is bolted over the coil, as can be seen at Fig. 3.

The crystal detector, a semi-permanent type, is bolted between the 'phone unit and the tuning condenser. The metal brackets on the writer's detector were only $\frac{1}{16}$ in. wide and required to be spaced 1 in. apart. There is space for a slightly larger detector. If you have to use a larger size, it is imperative that the bracket supporting the handle is kept inwards from the edge of the front panel by $\frac{1}{16}$ in., otherwise you may have difficulty in fitting the panel upon its casing.

The wiring can be easily followed from the back view

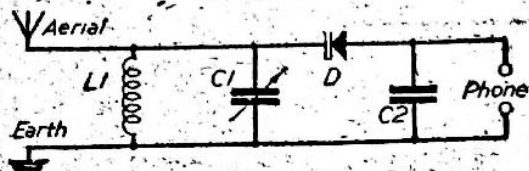


Fig. 4.—Theoretical circuit of the receiver.

at Fig. 3 which, together with the theoretical circuit diagram, explains everything clearly. A .001 mfd. fixed condenser is attached between the 'phone terminals. This component could be omitted from the circuit, but it is better to include it. Note that a flat, oblong condenser is used, and not a tubular type, the latter being too thick. However, if only a tubular type is available, it can be placed alongside the wire running from the earth terminal to the ear-phone terminal.

Back and Casing

Having wired the components and tested the circuit, make the casing. The back is cut to the same shape as the front panel. The case body consists of two shaped layers of wood glued together. Both shapes (B) are cut identical from $\frac{3}{4}$ in. wood.

When the glue sets, trimming at the inside may be necessary, following which the back is glued and nailed on. Use panel pins, or gimp nails, the heads being punched slightly for concealing with plastic wood or a wax cement. A $\frac{3}{16}$ in. diameter hole is bored at one side of the casing for the knob on the detector handle. The hole must be directly in line with the detector handle. The latter is inserted in the hole prior to fitting down the front panel on the casing.

The panel is held down (unglued) by means of six $\frac{1}{4}$ in. by 4 roundhead screws. The work can now be trimmed and glasspapered, and in order to get at the detector handle side properly the front should be removed and the detector handle taken away (this is done by merely unscrewing the bakelite knob and withdrawing the handle rod from its bracket).

The Finish

When glasspapered, make and fit the bottom piece (C), this being cut from $\frac{1}{4}$ in. wood. Attach with glue and a couple of nails, or $\frac{1}{4}$ in. by No. 4 flathead screws. The tenon may require to be levelled, using coarse glasspaper.

The case can be polished any colour, if birch plywood and deal fretwood has been used. If various kinds of wood have been used, the best finish is ebony black. A couple of coats of black polish should suffice, using a soft-haired brush.

To get at the polishing properly, the components should be removed from the front panel, then the latter re-screwed to the casing. When the polish dries, the parts are reassembled again and the panel attached to the casing.

Small Tuning Dial

A small knob, with a graduated collar, could be attached to the spindle of the tuning condenser. On

the other hand, a midget "pointer" knob, together with a marked tuning dial, as shown by the front view at Fig. 2, could be fitted.

The dial can be marked out on thin, stiff white ticket card, using black-drawing ink. Cut a $\frac{1}{2}$ in. diameter spindle hole in the dial. The dial is held against the front panel by means of the spindle nut.

The completed receiver fits into a coat pocket. It

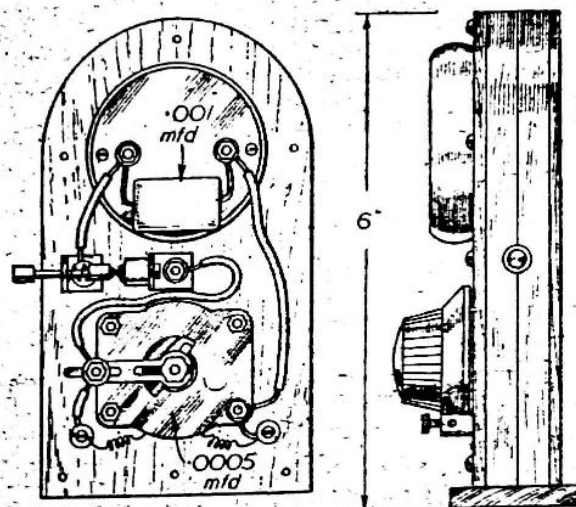


Fig. 3.—Back view showing wiring with side elevation of the completed receiver.

MATERIAL REQUIRED

- One front panel, $\frac{5}{8}$ in. by $\frac{3}{4}$ in. by $\frac{1}{4}$ in.
- One back piece. Same size as above.
- Two casing pieces, 6 in. by $\frac{3}{4}$ in. by $\frac{1}{4}$ in.
- One base piece, $\frac{3}{4}$ in. by $\frac{1}{4}$ in. by $\frac{1}{4}$ in.
- One 'phone unit, with $\frac{1}{2}$ in. diameter case.
- One variable condenser, .0005 mfd. with knob.
- One fixed condenser, .001 mfd.
- One semi-permanent double-crystal detector.
- Two 'phone terminals.
- Six roundhead and flathead screws, $\frac{1}{4}$ in. by No. 4.
- Some 28 s.w.g. coil wire, enamelled.

is just possible that it will operate on a throw-out aerial (meaning a 50 ft. coil of flexible wire cord suspended over tree branches) and a short earth wire connected to a metal stake which can be pushed into the ground.

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